PREFACE AND ACKNOWLEDGEMENTS

This Spokane PM_{10} Attainment Plan is submitted for adoption as a revision to the Washington State Implementation Plan (SIP) for Air Quality. It provides for attainment and maintenance of the National Ambient Air Quality Standard (NAAQS) for PM_{10} (particulate matter with an aerodynamic diameter of 10 microns or smaller) in the Spokane nonattainment area by setting forth a plan of action to control PM_{10} emissions in the area. The Spokane area has recorded exceedances of the NAAQS for PM_{10} since 1985. Since that time, a great deal of work has gone into characterizing the problem in the area, identifying the sources of PM_{10} emissions, and developing this plan to lower emissions and ensure healthful air for residents of the area.

This plan is the product of many peoples' work. The body of the report was authored by Barbara Stuart and Bruce Smith of the Washington State Department of Ecology Air Quality Program with continual guidance from Doug Schneider and Dan Johnson of the Department of Ecology and John Palmer, George Lauderdale, and others at the U.S. Environmental Protection Agency (EPA). Clint Bowman, Myron Saikewicz, and Tim Allen of the Department of Ecology provided the computer modelling to demonstrate attainment. Joan Rasmussen of the Department of Ecology provided information on the Spokane PM_{10} monitoring system and all of the air quality data. Ron Edgar, Kelle Vigeland, Fred Gray, and other staff of the Spokane County Air Pollution Control Authority provided much of the information on the area and point source emissions and did much of the work to develop the control strategy. Sally Otterson of the Department of Ecology, compiled the final emission inventory. A Spokane PM_{10} Attainment Plan Advisory Committee consisting of members from the City of Spokane, Spokane County, Spokane Regional Transportation Council, Washington State Department of Transportation, American Lung Association, Spokane Chamber of Commerce, and Kaiser Aluminum and Chemical Corporation, and assisted by staff of the Spokane County Air Pollution Control Authority, Department of Ecology, EPA, and the U.S. Soil Conservation Service reviewed and commented on the plan and coordinated development of the plan. A PM_{10} Technical Workgroup consisting of Advisory Committee members from the City of Spokane, Spokane County, Spokane Regional Transportation Council, and Washington State Department of Transportation, helped to develop the control strategy for the control of roadway dust. Tom Schuettke and Frank Soiza of the Department of Ecology helped in the production of many of the graphic figures used in the plan.

EXECUTIVE SUMMARY

PM_{10} STANDARDS

In accordance with the federal Clean Air Act (FCAA), the U.S. Environmental Protection Agency (EPA) promulgated revised National Ambient Air Quality Standards (NAAQS) for particulate matter in July of 1987. At that time the standard was changed from one of total suspended particulate (TSP) to PM_{10} (particulate matter with an aerodynamic diameter of 10 microns in size or smaller). The 24-hour standard for PM_{10} was set, and remains at 150 micrograms per cubic meter (ug/m^3), not to be exceeded, on the average, more than once per calendar year in any three year period. The level of the annual standard is 50 ug/m^3, on an annual average. Exposure to high levels of particulate matter are of concern because of adverse human health effects.

MONITORING NETWORK / RESULTS

A PM_{10} monitoring network was established in the Spokane area in 1985. Since then monitoring has occurred at eight different monitoring stations in the urban area and at one background monitoring station located south of Cheney at Turnbull Slough. Air quality measurements taken in the urban area have recorded 48 exceedances of the 24-hour standard from 1985 to 1993, and a maximum 24-hour PM_{10} concentration of 803 ug/m^3 was recorded on September 12, 1992 (this value was recorded during a dust storm). Exceedances of the 24-hour standard have been recorded every year since 1985, and the standard has been violated each year since 1987 (not 1985 because violations are based on three years of data). The area is therefore out of attainment of the 24-hour standard.

The area was also in violation of the annual standard in 1987 and 1988, but there have been no exceedances of the standard since that time. Therefore the area is in attainment of the annual standard. The highest annual mean PM_{10} concentrations for 1991, 1992, and 1993 were 44.4 ug/m^3, 45.5 ug/m^3, and 43.0 ug/m^3, respectively, as measured at the Crown Zellerbach monitoring station.

PLANNING BACKGROUND

The Spokane PM_{10} nonattainment area (NAA) was designated, and classified as "Moderate", when the FCAA was amended in 1990. The legislation also required the state to revise its state implementation plan (SIP) for air quality, and submit its revision (in the form of an attainment plan for the area) to the EPA. The plan is required to demonstrate both attainment of the NAAQS for PM_{10} by December 31, 1994 and maintenance of the NAAQS until 1997.

To meet deadlines in the 1990 amendments, a revised Spokane PM_{10} attainment plan was submitted to the EPA in November of 1991. That SIP revision used rollback modelling to demonstrate attainment, but EPA subsequently requested that

dispersion modelling be used. The attainment plan being submitted here relies on dispersion modelling to demonstrate attainment.

EMISSION INVENTORY

Characterizing PM_{10} emissions in the Spokane nonattainment area has proven to be a complex task because of the variety of sources, the change in relative significance of sources, and the seasonality of exceedances. The air quality analysis provided in the attainment plan indicates that windblown dust from outside the Spokane PM_{10} nonattainment area, and especially wind blown dust generated during dust storms, is a significant contributor to air quality problems in the area. The Department of Ecology, however, is proposing to deal with such emissions over a period of several years after conducting a thorough investigation of the problem. Therefore, with submittal of this attainment plan, Ecology is requesting a three year waiver of the December 31, 1994 attainment date for Spokane in accordance with EPA guidance.

An inventory of emissions from sources within the Spokane PM_{10} NAA conducted in 1990 indicates that area sources are the dominant category of emissions, accounting for 88% of the total annual emissions in the area, excluding windblown dust. Of these, the single most predominant area source is unpaved roads, at 44% of the inventory. The next largest sources are paved roads at 20% and residential wood combustion at 19%. Point sources make up 12% of the inventory. Total emissions were calculated at 7,806 tons of PM_{10} per year in 1990 (disregarding the effect of some residential wood combustion controls that were already implemented), and these emissions have been projected to 8,241 tons per year in 1994 and 8,565 tons per year in 1997.

With windblown dust emissions excluded, instead of one 24-hour worst-case emission inventory, Spokane actually has three different "worst-case" scenarios, each involving a different mix of sources and occurring at different times of the year under different conditions. During winter (between December and February) residential wood combustion emissions dominate, and in the spring (February and March) paved road emissions dominate. In the fall (between September and November) unpaved road emissions dominate, even when they are not the largest source of emissions, because they tend to be more concentrated.

CONTROL STRATEGY

To control emissions from unpaved roads, the City of Spokane and Spokane County have implemented a variety of RACM (reasonably available control measures). The City has paved, or is in the process of paving, a total of 14.08 miles of unpaved roads at a total cost of over 6 million dollars, and it has begun, or will soon begin, regular dust control treatments on an additional 1.73 miles of unpaved roads. The County is in the process of paving 2.4 miles of unpaved roads at a cost that is yet to be determined. In both cases, the additional paving and dust control treatments are being implemented through a new Spokane County Air Pollution Control Authority (SCAPCA) regulation to control particulate matter on

unpaved surfaces, which was adopted on August 4, 1994. These efforts are expected to reduce the fugitive dust emissions from these roads by 90-100%.

To control emissions from paved roads, the Spokane County Air Pollution Control Authority, in cooperation with the City of Spokane, Spokane County, the Washington State Department of Transportation, and other agencies, has developed and adopted a new regulation which establishes standards for the control of particulate matter on paved surfaces, including trackout material and sanding materials used for winter traction. The regulation is designed to achieve and maintain at least a 70% reduction in the 24-hour PM_{10} emissions from paved surfaces experienced during the 1992-93 winter season.

To control emissions from residential wood combustion, the Spokane County Air Pollution Control Authority adopted a Solid Fuel Burning Device Standards regulation in 1987. The regulation established an effective program for the control of residential wood stove emissions. In its current form, the regulation bans the use of uncertified wood stoves when ambient PM_{10} levels reach 75 ug/m^3 and bans the use of all wood stoves when ambient PM_{10} levels reach 105 ug/m^3. It also includes an extensive education component, and it provides for aggressive enforcement of curtailments. The curtailment program itself has been determined to provide an 80% reduction in residential wood combustion emissions.

ATTAINMENT DEMONSTRATION

All of the above-listed control measures were evaluated through dispersion modelling to determine their effectiveness at attaining and maintaining the NAAQS for PM_{10} by 1994, and through 1997. In each case the emission reductions achieved were determined to be more than sufficient to attain and maintain the standard through these years. Nevertheless, in addition to the control measures described above, the attainment plan includes five contingency measures, which are already in effect, or will automatically become effective in the event that a violation of the NAAQS for PM_{10} occurs.

All of the above-listed control measures can be summarized as follows:

	Control Efficiency
Pre-1994 Control Measures:	
Unpaved Roads:	90-100%*
City Street Paving	
County Street Paving	
Paved Roads: (Traction Materials)	70%
City Resolution #90-93 re: Street Sweeping	
City Resolution #90-43 re: Reduced Use of Sanding Materials	
SCAPCA Paved Road Control Regulation	

Residential Wood Combustion: 80%
State Law & Regulations
SCAPCA Regulation/Curtailment Program

Additional Controls Needed for Attainment:
Unpaved Roads: 90-100%*
City Street Paving & Oiling
County Street Paving

Contingency Measures:
Unpaved Roads:
SCAPCA Unpaved Road Control Regulation
County Parking Lot Paving Regulation
Paved Roads:
Early Implementation in SCAPCA Regulation
to Control Particulate Matter
SCAPCA Trackout Regulation
Residential Wood Combustion:
SCAPCA Ban on Uncertified Stoves

* Depending upon the pre-control condition of the road being paved or oiled and the level of control applied.